

PATENT SPECIFICATION

1,139,216

DRAWINGS ATTACHED.

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1,139,216



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COMPLETE SPECIFICATION.

Improvements in or relating to Respirators.

We, UNITED KINGDOM ATOMIC ENERGY AUTHORITY, London, a British Authority, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to respirators for protecting the respiratory organs from a toxic atmosphere. Known respirators consist of a resilient face-piece adapted to form a gas-tight seal against the face, in which face-piece are mounted such features as visors or windows, non-return inlet and outlet valves through which inhaled and exhaled air enters and leaves the respirator, speech diaphragms and connections or adaptors for filters or pipelines.

Known non-return outlet valves consist of a movable sealing member which is movable on to and off a corresponding seating by variation in the pressure in the respirator. The normal breathing processes of the wearer of the respirator are used to operate this valve, exhalation raising the pressure in the respirator and moving the movable sealing member off its seating, and inhalation lowering the pressure in the respirator and causing the movable sealing member to return to its seating and close the valve.

So long as the inhalation and exhalation stages are smooth, the non-return valve can be regarded as satisfactory. If, however, the wearer coughs and inhales abruptly immediately afterwards, or otherwise catches his breath during exhalation, the wearer may suck toxic atmosphere in because the movable sealing member may not have properly returned to its seating.

An object of this invention is to provide a respirator which has a non-return outlet

valve assembly which substantially reduces the risks to the wearer in the above circumstances.

The invention consists in a respirator comprising a resilient face-piece adapted to form a gas-tight seal with the face of the wearer, a port mounted in the said face-piece, said port having a movable sealing member movable onto and off a seating to form a non-return valve allowing egress of exhaled air to the surrounding atmosphere, a chamber mounted on the exterior of the respirator, said chamber covering the said port and having peripheral outlet ports to the atmosphere facing said sealing member, a dome mounted over said sealing member and having peripheral ports in said dome, and an inwardly directed annular shielding wall located between said outlet ports and said ports in said dome.

The section drawing illustrates by way of example an embodiment of the invention. In the drawing, a rubber moulded face-piece 1 for covering the eyes, nose, mouth and chin has an air-filled cushion 2 for forming a good gas-tight seal against the face. Lugs 3, 4 and 5 are each folded back to form a loop fixed in place by plastic buttons 6, 7 and 8 to carry plastic buckles 9, 10 and 11 and to the buckles can be attached one side of a smooth six-strap head-harness (not shown). A rigid visor 12 of transparent plastic material is firmly mounted in the face-piece 1 by the techniques well known in the art. A detachable rubber nose-piece 13 has two inlet mushroom valves, only one 14 being visible, and is fitted into a groove 15 in a rigid plastic ring 16 having an internally threaded annular extension 17.

The ring 16 is firmly mounted in the face-piece 1 by the techniques known in

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the art. A rigid plastic tubular member 18 has external threads corresponding to the internal threads of annular extension 17 to allow it to be screwed firmly into the said extension and lock in place a rigid plastic dome 19 having a plurality of small circular ports 20—27 near its periphery. These ports face on to a rubber ring gasket 28. A spider 29 of rigid plastic material is fixed in the ring 16 and carries a flexible disc-shaped rubber diaphragm 30 which seats on the spider to form a non-return exhalation valve. A suitable plastic is moulded nylon.

15 An inwardly directed annular wall 31 defines a central port which faces on to the centre of the dome 19, the wall covering the ports 20—27.

20 A threaded lid 32 screws on to the end of tubular member 18 and contains an annular series of small ports 33 and 34 which face on to the wall 31. Two inlet valves are symmetrically mounted in the cheeks of the face mask 1. The only valve visible comprises an annular ring of rigid plastic material 35 forming a port, and a rubber diaphragm 36 supported on spokes (not visible) of the ring 35. The exterior portion of the port is adapted to couple to an air line or filters etc.

30 It can be seen that the rubber diaphragm 30 is in effect shielded from the external atmosphere by a series of baffles which force the atmosphere to move in a labyrinthine manner and which prevent any toxic particles from impinging on the diaphragm 30 if they travel in a straight path.

35 If the wearer coughs, the rubber diaphragm 30 is blown violently off its seating formed by the spider 29 and exhaled air fills the chamber formed by the assembly

carried on ring 16, which has a capacity of about 6 cubic inches. If the wearer immediately inhales abruptly, a portion of the non-toxic exhaled air in the chamber assembly returns and allows the rubber diaphragm to reseat on spider 29 before any toxic atmosphere can reach it. Suitable internal dimensions of tubular member 18 are approximately $2\frac{1}{2}$ inches diameter by $1\frac{1}{4}$ inches long, giving a volume of about 6 cubic inches.

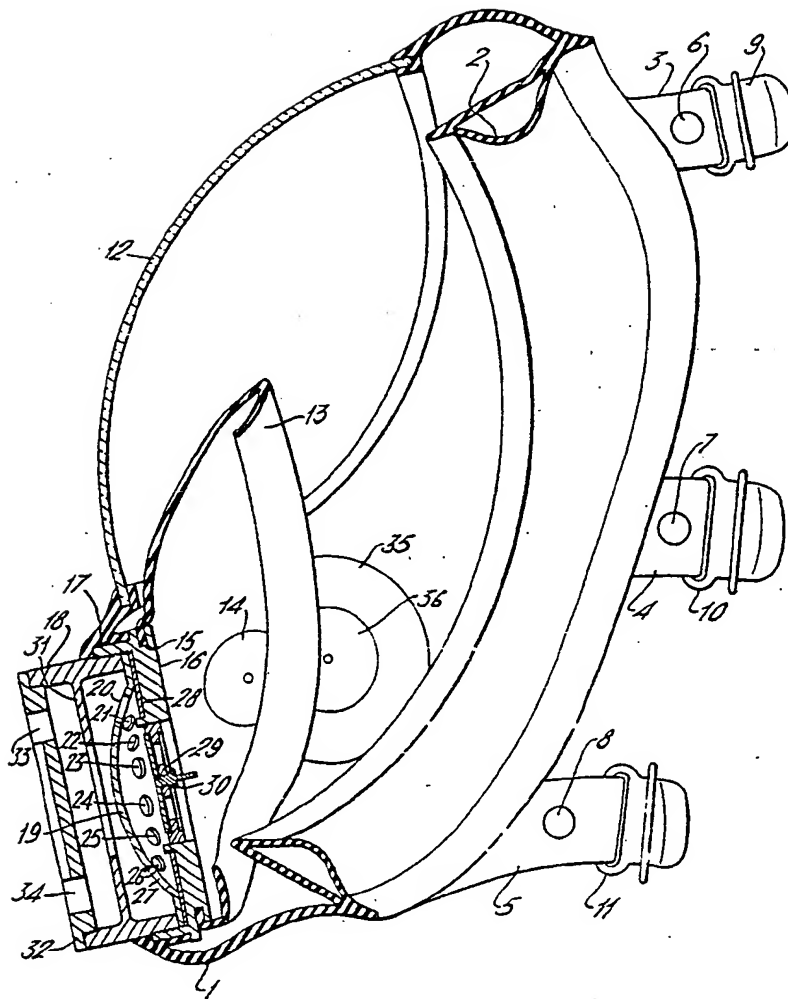
The series of baffles in the chamber prevent direct ingress of heavy travelling particles while the rubber diaphragm is not on its seat.

WHAT WE CLAIM IS:—

1. A respirator comprising a resilient face-piece adapted to form a gas-tight seal with the face of the wearer, a port mounted in said face-piece, said port having a sealing member moveable onto and off a seating to form a non-return valve allowing egress of exhaled air to the surrounding atmosphere, a chamber mounted on the exterior of the respirator, said chamber covering said port and having peripheral outlet ports to the atmosphere facing said sealing member, a dome mounted over said sealing member and having peripheral ports in said dome, and an inwardly directed annular shielding wall located between said outlet ports and said ports in said dome.

2. A respirator substantially as hereinbefore described and illustrated with reference to the drawing accompanying the Provisional Specification.

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